MAGNETIC STUDIES OF AVANHANDAVA H4 AND BJURBÖLE L4 CHONDRULES

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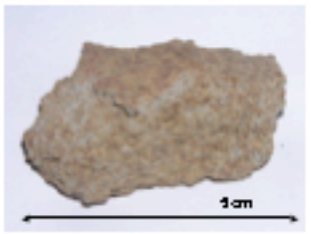
Introduction: The Avanhandava (H4) and Bjurbōle (L4) chondrites represent primitive chondritic material of low metamorphic degree. Their friable nature allows to pick up oriented individual chondrules and to study their magnetic properties and magnetic mineralogy.

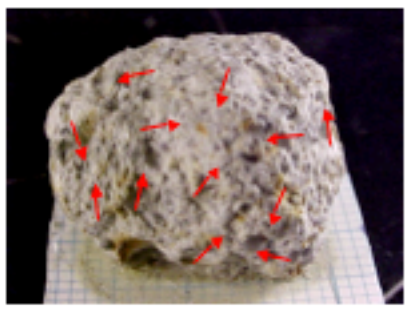
AVANHANDAVA H4

BJURBÖLE L4

Chondrule magnetic conglomerate test

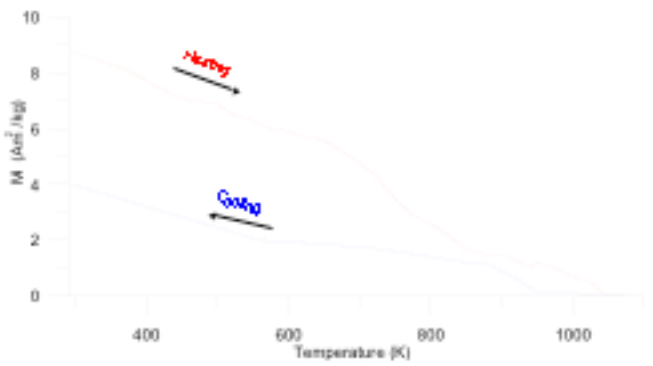


The stereonet projection of the chondrule magnetic directions. The magnetic conglomerate revealed randomly magnetized chondrules and uniformly magnetized matrix.

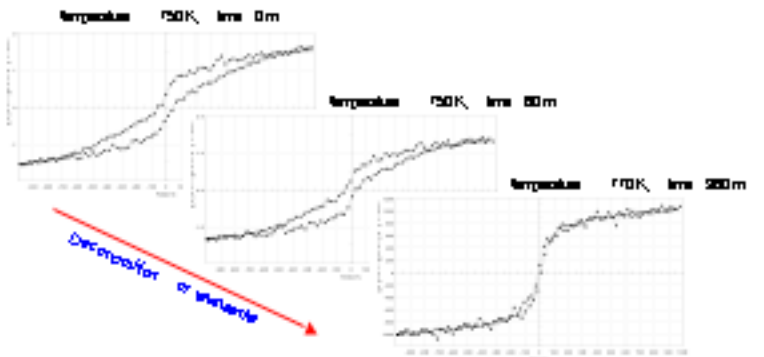


The chondrules of the Bjurböle meteorite shows random distribution of magnetic directions.

Magnetomineralogy investigations

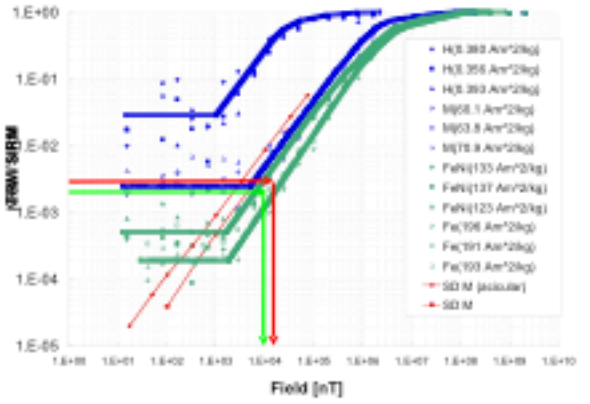


The magnetic carrier in Avanhandava chondrules in kamacite. Kamacite is characterized by low coercivity (<10 mT) and a–g transition at 1030 K on heating and g–a transition at 930 K on cooling curve.



Based on high coercivity of Bjurböle chondrules the tetrataenite was identified as main magnetic phase. During thermomagnetic investigations the decomposition of tetrataenite to kamacite in 750 K – 770 K temperature range was observed.

Magnetic paleofield estimate for chondrules



Paleofield estimate: The paleofield method based on the REM ratio (NRM/SIRM) [1] reveals approximate paleofields between 5 μT and 20 μT (REM ~ 0.002) for Avanhandava chondrules and between 12 μT and 45 μT (REM ~ 0.0015–0.0048) for Bjurböle chondrules. The method is based on comparison of chondrule REM ratio to the data obtained by laboratory TRM experiments with various FeNi alloys.

Conclusions: **Despite the different magnetomineralogy** the chondrules of both Avanhandava and Bjurböle meteorites show a **low and randomly oriented NRM**. The **paleofields** determined on chondrules are **lower than geomagnetic field**. That suggests together with random NRM directions that chondrules are not magnetically contaminated by geomagnetic or artificial fields and obtained their magnetization prior the conglomeration to parent body.

References: [1] Kletetschka G. et al, 2006; TRM in Low Magnetic Fields: a minimum field that can be recorded by large multidomain grain. Physics of the Earth and Planetary Interiors 154 (3-4), 290-298, 2006.

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